

## EARLY SUCCESSES INSPIRE FISH HATCHERY OWNERS TO ADOPT CRYOPRESERVATION TECHNOLOGY

By Md. Rafiqul Islam Sarder, Mohammad Matiur Rahman, Mariom, and Terrence R. Tiersch

Md. Anwar Hossain is leveraging cryopreserved sperm to produce quality mrigal and bighead carp. The senior assistant general manager of Biswas Agro Fisheries and Hatchery in the Mymensingh region of Bangladesh has already seen the promise of cryopreserved sperm-originated seeds (fertilized eggs). He has seen better length and weight gain of cryopreserved sperm-originated seeds than those originating from hatchery-reared males.

“I believe it is possible to develop quality broodstocks of mrigal and bighead carp by rearing cryopreserved sperm-originated seeds,” Hossain said. “My plan is to produce seeds from those broods in our hatchery.”



*Here, participants are attentively listening during a day-long training workshop on sperm cryopreservation technology. (Photo by Mohammed Jahangir Alam)*

In 2020, aquaculture production contributed 57% of the total fish production in the country. Indian major carps (IMCs), catla (*Catla catla*), rohu (*Labeo rohita*), and mrigal (*Cirrhinus cirrhosus*) are the prime aquaculture species and contributed about 29% to aquaculture and 19% to total fish production. Exotic carps, silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys nobilis*), and grass carp (*Ctenopharyngodon idella*) also contributed 12% to aquaculture and 10% to total production.

Presently, the rate of aquaculture production has increased due to adoption of some new technologies but has not achieved maximum production levels compared to other major fish-producing countries like China and India. Limited availability of quality seeds of IMCs and exotic carps and inadequate supply to the farmers is a major problem leading to decreased production. The quality of seed has deteriorated due to inbreeding, interspecific hybridization, and negative selection. As a result, fry (newly hatched fish) show slow growth, high mortality, and disease susceptibility.

To resolve these commonly found issues in the aquaculture industry, a research project was started in 2020 to develop cryogenic sperm banking of Indian major carps and exotic carps. The project is funded by the Feed the Future Innovation Lab for Fish and implemented by the Department of Fisheries Biology and Genetics at Bangladesh Agricultural University.

In the 2021 breeding season, there was successful breeding of rohu, mrigal, silver, and bighead carps in two public and seven private hatcheries. Both cryopreserved and fresh sperm-originated seeds were reared separately in the nursery ponds of the respective hatcheries. To compare the growth rate, length and weight data of the fish fry were taken on a monthly basis from every nursing pond.

## PROJECT TEAM

### Lead PI and Bangladesh PI

Md. Rafiqul Islam Sarder, PhD  
Bangladesh Agricultural University

### Bangladesh Co-PI

Mohammad Matiur Rahman, PhD  
Bangladesh Agricultural University

### U.S. PI

Terrence Tiersch, PhD  
Louisiana State University  
Agricultural Center

“I am happy to see that the growth rate of cryopreserved sperm-origin fry is much more than those from fresh sperm-origin of silver carp in my hatchery,” said Md. Abdul Alim, the owner of Mukteshowri Fish Hatchery in Jashore. “I am hopeful that quality seeds and broods can be produced by this technology, and I am interested in breeding other species with cryopreserved sperm during the next breeding season.”

In Matri Fish Hatchery in Jashore, rohu, mrigal, and silver carp were bred successfully by cryopreserved sperm as well as fresh sperm.

Jahidur Rahman, owner of the hatchery, said, “Since the growth of cryopreserved sperm-originated fry in my hatchery is much higher than those of fresh sperm, we are rearing those fries carefully, so they become good quality broods.”

Md. Abu Nasar Sardar, hatchery owner of Suriya Nur Matsha Hatchery in Rajbari, also had fruitful results from using cryopreserved sperm.

“I got better results than control sperm,” he said. “Thanks to this, I am rearing 100 bighead carp fingerlings with special care for producing broods.”

---

## ABOUT THE FISH INNOVATION LAB

The Fish Innovation Lab supports the United States Agency for International Development’s agricultural research and capacity building work under Feed the Future, the U.S. Government’s global hunger and food security initiative. Mississippi State University is the program’s management entity. The University of Rhode Island, Texas State University, Washington University in St. Louis, and RTI International serve as management partners.

[www.feedthefuture.gov](http://www.feedthefuture.gov)  
[www.fishinnovationlab.msstate.edu](http://www.fishinnovationlab.msstate.edu)